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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/544,266	01/10/2006	Dong-Kyun Seo	4647-A1PCUS	1339
7590 GREG L MARTINEZ 3116 South Mill Avenue Suite 408 Tempe, AZ 85282		06/08/2007	EXAMINER VANNOY, TIMOTHY C	
			ART UNIT 1754	PAPER NUMBER
			MAIL DATE 06/08/2007	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.



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<b>Office Action Summary</b>	<b>Application No.</b> 10/544,266	<b>Applicant(s)</b> SEO ET AL.	
	<b>Examiner</b> Timothy C. Vanoy	<b>Art Unit</b> 1754	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 01 August 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 35-54 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 35-54 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 August 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Re-mailing of Previous Office Action***

The Office Action mailed on 09-25-2006 has been returned to the Patent Office because the attorney's new mailing address had not been updated in the PALM records for this application. The attorney's new mailing address submitted in the Power of Attorney filed on 02-16-2006 has now been entered into the PALM records for this application. This Office Action is a re-mailing of the previous Office Action mailed on 09-25-2006, and is being mailed to the attorney's new address.

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 38-40 and 46 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a) Claims 38-40 are vague and indefinite because it is not clear exactly what the relationship is between the provision of the second and third materials and the amount of heat. What happens to the provision of the second and third materials if the amount of heat is decreased? What happens to the provision of the second and third materials if the amount of heat is increased?

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b) Claim 46 is vague and indefinite because it is not clear how the nanocrystals "operate" as a nanowire. This claim does not provide and details concerning this "operation".

***Claim Rejections - 35 USC § 102***

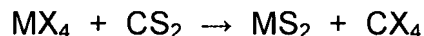
The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 35-40 are rejected under 35 U.S.C. 102(b) as being anticipated by U. S. Patent 4,208,394 to Chianelli.

U. S. Patent 4,208,394 in col. 2 Ins. 18-37 describes a reaction between a halide of at least one Group Ivb or Vb transition metal and carbon disulfide to form a transition metal sulfide and carbon tetrahalide, according to:



where M is at least one Group Ivb or Vb transition metal and X is at least one halide.

Col. 2 Ins. 59-61 in U. S. Patent 4,208,394 sets forth that the reaction may be in the liquid phase.

Claims 35-40 are rejected under 35 U.S.C. 102(b) as being anticipated by U. S. Patent 4,678,584 to Elfline.

U. S. Patent 4,678,584 in col. 3 lns. 29-39 describes what appears to be a liquid phase reaction between an aqueous solution of sodium hydroxide and carbon disulfide to form sodium trithiocarbonate, according to:



Claims 41-48 are rejected under 35 U.S.C. 102(b) as being anticipated by U. S. 6,303,097 B1 to Kinsman et al.

Claim 1 in U. S. Patent 6,303,097 B1 sets forth a method for making metal sulfide, comprising:

reacting an elemental carbon (i. e. the applicants' "third material") with gaseous hydrogen sulfide (i. e. the applicants' "second material") to produce gaseous carbon disulfide (i. e. the applicants' "fourth material") at a temperature of 900-1,500 °C (i. e. the applicants' "first amount of heat"), and

passing the gaseous carbon disulfide into a second reaction zone which contains metal oxide (i. e. the applicants' "first material") so as to result in a reaction between the carbon disulfide and the metal oxide to produce metal sulfide (i. e. the applicants' "fifth material") at a temperature of 500-1,500 °C (i. e. the applicants' "second amount of heat").

Claims 49-54 are rejected under 35 U.S.C. 102(b) as being anticipated by U. S. Patent 5,958,281 to Takada et al.

Example 1 in U. S. Patent 5,958,281 describes a method for making  $0.01\text{Li}_3\text{PO}-0.63\text{Li}_2\text{S}-0.36\text{SiS}_2$  glass from various lithium sulfides and silicon sulfides, comprising:

- providing lithium sulfide (i. e. the applicants' "first material");
- providing a bath of molten sulfur (i. e. the applicants' "chalcogen material");
- providing silicon powder (i. e. the applicants' "second material which is reactive with the chalcogen material");
- reacting the molten sulfur and silicon powder together to form silicon sulfide (i. e. the applicants' "third material"), and
- reacting the lithium sulfide and silicon sulfide together to form the lithium ion-conductive solid electrolyte which formed the oxysulfide glass represented by the formula:  $0.01\text{Li}_3\text{PO}-0.63\text{Li}_2\text{S}-0.36\text{SiS}_2$  (i. e. the applicants' "fourth material").

Claims 41-54 rejected under 35 U.S.C. 102(b) as being anticipated by the English abstract of CN 1251348.

The English abstract of CN 1251348 describes what appears to be the same method for manufacturing what appears to be the same metal sulfides (i. e. "semiconductor materials") by reacting a metal salt; a non-metal element (such as S, Se, Te. . . etc.) and a boron hydride in the presence of an organic solvent to produce the semiconductor materials.

The following references are made of record:

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U. S. Patent 5,279,801 disclosing the production of binary rare earth/sulfur or transition metal/sulfur compounds from a rare earth oxide (or transition metal oxide) and carbon disulfide (please see the abstract);

U. S. Patent 4,557,914 disclosing a process for producing substances that are optically transparent to infra-red rays via a reaction between chalcogen hydride and a metal halide;

U. S. Patent 4,542,009 disclosing the use of mixed metal sulfides as battery electrodes (please see col. 3 lns. 17-31), and

U. S. Patent 4,374,037 disclosing a method for making divalent europium activated calcium sulfide phosphors.

The following references from the applicants' Search Report are made of record:

U. S. Patent 4,778,539 disclosing a process for producing a  $\text{PbMo}_6\text{S}_8$  type compound superconductor;

U. S. Patent 3,770,422 disclosing a process for purifying Eu and Tb and forming refractory compounds therefrom;

U. S. Patent 3,009,977 disclosing a thermoelectric material; and

the article titled "Bulk Synthesis of Inorganic Fullerene-like  $\text{MS}_2$  ( $\text{M} = \text{Mo}, \text{W}$ ) from the Respective Trioxides and the Reaction Mechanism" by Y. Feldman et al. disclosing the synthesis of inorganic fullerene- $\text{MS}_2$ .



Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy C. Vanoy whose telephone number is 571-272-8158. The examiner can normally be reached on Mon-Fri 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman, can be reached on 571-272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

*Timothy C Vanoy*  
Timothy C Vandy  
Primary Examiner  
Art Unit 1754

tv